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THE RELATIONSHIP OF EYE AND HAND DOMINANCE AND THE SKILL OF BATTING

BY

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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submitted by YVONNE MARIE BECKER

in partial fulfilment of the requirements for the degree of Master of ARTS

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ABSTRACT

The purpose of this study was to determine the relationship between dominance types and batting performance in womens' fast pitch softball. Also, the purpose was to determine if placing dominant body parts closer to the pitcher by batting from a particular side of the plate would show a relationship to batting performance scores.

The sample consisted of 64 senior category women fast pitch softball players from three Canadian provinces.

A total of four tests were given to each subject to determine the dominant eye, hand and foot.

Chi square 2 x 2 table statistical analysis was employed to examine the data.

The study concluded that no eye-hand dominance combination is predictive of batting performance in women's fast pitch softball, and that there was no significant difference at the .05 level between batting performances of those subjects who batted from the side of the plate that placed their dominant body parts closer to the pitcher and those who did not.

ACKNOWLEDGEMENT

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CHAPTER I

INTRODUCTION

In recent years fast pitch softball pitchers have developed to such an extent that it is not unusual for the pitched ball to cross the plate at very high speeds. This fact necessarily implies that the batter must react quickly and accurately in order to achieve the objective of hitting the ball so as to reach base safely.

It has been hypothesized by McGee (1975) that a majority of players would be more successful in accomplishing this objective if they were to stand at the side of the plate such that their dominant body side is nearest the pitcher. That is, he suggested that a right side dominant batter (right eyed, right handed and right footed), should stand in the batter's box nearest first base. This would place the dominant eye nearer the pitcher for better sighting of the ball as well as the dominant hand at the bottom of the bat to provide more power for the swing. Also, the weight transfer, which is necessary in batting, would be made onto the dominant leg or, according to McGee (1975), the skill leg which gives better balance throughout the swing.

Traditionally, right handed individuals are taught to bat from the batter's box nearest to third base. Although not all right handed players are necessarily right eyed as will be discussed later, if the individual is right side dominant, it would seem at first glance that batting from this position would put the player at a disadvantage.

Therefore, according to McGee (1975), individuals who are right side dominant and bat from the batter's box closest to third base would be most successful in terms of batting performance.

THE PROBLEM

It is the purpose of this study to determine the relationships between various combinations of eye and hand dominance and the skill of batting in fast pitch softball. As well, a discussion of McGee's (1975) hypothesis will be included.

This purpose will be achieved by determining eye and hand dominance of the subjects in the sample and then comparing the various batting performances of the subjects.

JUSTIFICATION OF THE PROBLEM

It would seem beneficial for the introduction of the game of fast pitch softball to young children to determine whether or not the dominant eye and hand do affect the success that the player will have in performing the skill of batting.

NULL HYPOTHESIS

The following null hypothesis was tested at the .05 level of significance: there is no significant difference between batting performance and dominance type.

A subsidiary null hypothesis was tested at the .05 level of significance: there is no significant difference between batting performance for subjects batting from the side of the plate that places dominant eye and hand closest to the pitcher and batting performances for those who do not.

DELIMITATIONS

1. The study involved five women's senior category fast pitch soft-

ball teams from Alberta (2), Saskatchewan (2), and Ontario (1).

2. The sample consisted of 64 players who ranged in age from 18 to 35 years.
3. Testing of all subjects took place at two sites; a senior category women's fast pitch softball tournament held in Sangudo, Alberta on July 5 - 6, 1980 and a similar tournament held in Manville, Alberta on July 12 - 13, 1980.

LIMITATIONS

1. The wide range of "times-at-bat" in the study is a limitation.
2. The study may be limited by the reliability of the test for eye dominance.
3. The small sample size is a limitation of this study.

DEFINITION OF TERMS

1. Dominance for this study, is defined as any sort of physiological pre-eminence, priority or preferential activity of one member of a bilateral pair of organs (Coren and Kaplan, 1973).
2. For this study, lateral dominance shall be categorized as follows:
   Pure dextrality - right handed and right eyed
   Pure sinistrality - left handed and left eyed
   Crossed dextrality - right handed and left eyed
   Crossed sinistrality - left handed and right eyed
3. The third base side of home plate is that side that is to the left when standing behind home plate and looking toward the outfield.
4. The first base side of home plate is that side that is to the right when standing behind home plate and looking toward the outfield.

5. For the purposes of this study, the term 'hit' is operationally defined as the act of making contact with the pitched ball so that it lands in fair territory, allowing the batter to reach base safely.

CHAPTER II

REVIEW OF LITERATURE

In an article by Weiskopf (1977), it was indicated that hitting a baseball is the most difficult single act performed by an athlete. The basis for this remark lies in the fact that a baseball thrown at eighty miles per hour will reach the plate in about 4/10's of a second. It takes the batter 2/10's of a second to remove the bat from its starting position at the shoulder to the point of impact. Therefore, a batter must sight the ball's position after it has travelled only 25 - 35 feet from the pitcher. With this in mind, and considering that the pitcher's mound in fast pitch softball is located forty feet from home plate compared to sixty feet in baseball, and that the ball is often thrown at similar speeds, the task of hitting a pitched softball is difficult indeed.

In order to perform this task, it has been suggested by Adams (1965), that it would be advantageous to bat in such a way as to have an unobstructed view of the approaching ball. If the dominant eye is on the body side away from the pitcher, it is possible that the view of the ball by the dominant eye may be obstructed by the bridge of the nose.

Hubbard and Seng (1954) stated in their study of visual movements of batters that the problem the batter has is one of tracking a moving object, deciding what its course is and then, at some point, deciding whether to swing or not. It was found in this study that the batter tracked the pitched ball with pursuit eye movements, rather than saccidic eye jerks or head movements. It seems important therefore, to know

the role played by the dominant eye in the above mentioned task of tracking the pitched ball.

EYE DOMINANCE

In the literature there are many definitions of eye dominance. Gilchrist (1976) indicated that there is much confusion regarding the dominant eye and that this confusion stems from two facts; the method of testing eye dominance, and the fact that both eyes are represented in both halves of the visual cortex allowing for no simple relationship between cerebral dominance and the dominant eye.

Coren and Kaplan (1973) reported that ocular dominance is a "multifaceted phenomenon" and reviewed three different types of eye dominance; sighting, sensory and acuity dominance.

Sighting dominance was discussed by Miles (1930) and Crovitz and Zener (1962) as the phenomenon of the dominant eye being the eye that is chosen in the performance of monocular tasks. Tasks such as these include sighting a rifle or looking through a telescope. Both Miles (1930) and Crovitz and Zener (1962) devised tests for such sighting tendencies and have shown consistent preferences in the eye used for monocular tasks.

Coren and Kaplan (1973) stated that when two eyes perceive different stimuli and when the different stimuli cannot be fused, as in the case of sighting a near and far target, a double image appears of the near target and that one of the double images (the non-dominant image), is suppressed and the dominant eye image takes precedence. Hildreth (1949) also noted this type of sensory dominance.

Some investigators have taken the meaning of the dominant eye to

be that of the eye with better visual acuity. However, Gahagan (1933), Coons and Mathias (1928) and Clark (1952) all reported no relationship between the dominant eye and the eye with the best visual acuity.

Analysis of data from Coren and Kaplan's (1973) study of 57 subjects resulted in the above mentioned types of eye dominance; sighting dominance, sensory dominance and acuity dominance.

In view of the fact that there is more than one type of eye dominance, one can find in the literature a multitude of testing procedures to determine eye dominance. Many eye dominance tests are modifications of the Porta-Rosenbach alignment test as described by Miles (1930). This test consists of having the subject align a pencil to an object approximately seven feet away and the examiner observing which eye is aligned with the pencil and the object. Two of these variations are the hole-in-card test and the ring test in which the task is to line up a near target (the hole in the card or the ring), with a fixated far target. In these tests the subject must disregard one of the double images of the near target and choose the other to align it with the far target. Adams (1965) utilized two such alignment tests in his study of baseball players.

The most commonly used eye dominance test in the literature is Parson's manuscope test or variations of it. According to Miles (1930), the manuscope is a cone shaped chamber large enough at one end to cover both eyes and tapered at the other end so as to close off part of the visual field. As the individual views an object through the tapered end, the choice of eye (the one seen through the tapered end), could be seen by the examiner. The results of this test therefore,

were not dependent on a subject's response and since the device could be held in two hands, was free from the effects of the dominant hand holding the device. Banister (1935) tested soldiers for eye dominance so as to relate it to shooting ability. Four tests were used to determine eye dominance including the manuscope test. It was stated by Banister (1935) that the manuscope test was bound to be unreliable due to the fact that the device "compels the subject to use one eye or the other" and therefore eliminates the possibility of ambiocularity.

Other tests for eye dominance indicated in the literature include:

1. Ring Test (Banister, 1935) - a ring is held at arm's length so that an object can be seen through it; the eye aligned with the ring and the object was noted as the dominant eye.
2. Pointing Test (Coren and Kaplan, 1973) - the subject is asked to point to the examiner's nose; the eye with which the finger is aligned was noted as the dominant eye.
3. Alignment Test (Banister, 1935) - subject was asked to raise a pencil from the side until it was in line with an object; the eye with which the pencil was aligned was noted as the dominant eye.
4. Aiming A Gun (Miles, 1930) - subject was asked to aim a rifle at a distant object; the eye used to sight with was noted as the dominant eye.
5. Hole-In-Card Test (Adams. 1965) - subject is asked to sight through a hole placed in a small square of cardboard to an object some distance away; the eye seen through the hole in the card was noted as the dominant eye.

It is obvious from the literature that of the many tests used, some form of dominance is always observed and as Fink (1933) stated,

"... ocular dominancy is characteristic of the ocular mechanism".

Studies by various researchers have given various percentages of right, left and non-preference eye dominance. These figures are shown in Table I below.

TABLE I

EYE DOMINANCE PERCENTAGES
BY AUTHOR

AUTHOR	N	RIGHT	LEFT	NEITHER
Miles (1930)	50	64%	36%	0%
Fink (1933)	-	75%	23%	2%
Lund (1932)	247	69.9%	25.3%	4.7%
Clark (1952)	-	65%	35%	0%
Belmont & Birch (1967)	148	53%	21%	26%
Way (1958)	410	61.9%	34.1%	4%

HANDEDNESS

To determine the effect of eye dominance in motor tasks it seems necessary to investigate handedness and the relationship between handedness and eyedness.

The reason for preferential use of one hand over the other is not clearly understood. Corbin (1973) indicated that it is a "universally observed developmental process". There are many explanations proposed for the phenonmenon of handedness, two of which were mentioned in Corbin (1973). The first is that handedness is a result of a cultural influence, that is, it is learned and habitual. The second is that handedness is a result of neurological influences, that is, each individual has two bilaterally asymmetrical hemispheres of the brain which are connected by nerves to the limbs on the two opposite sides of the body. The assumption is that motor controls for the dominant hand are grouped in the dominant sphere (left sphere for right handed

persons and right sphere for left handed persons). As stated by Hildreth (1949), "people are right handed because they are left brained".

In tests of movement efficiency and handedness, it has been shown that the preferred hand is more accurate and faster in the accomplishment of tasks. Flowers (1975) found that in 'ballistic' type movements, that is, movements that are carried out without any form of feedback once initiated, (the example used in this study was that of scales and finger exercises in instrument playing), the preferred and non-preferred hands were close in terms of movement time and accuracy. However, a difference occurred when the performance involved a movement that was of the 'corrective mode', that is, involving continuous feedback monitoring and corrective movements, (the example cited was that of bowing a stringed instrument). In these tasks, the preferred hand was faster and more accurate.

A test for handedness was devised by Crovitz and Zener (1962) which was a series of fourteen activities listed on a questionnaire to which the subject responded as to which hand would be used to perform the activity. Some of the questions included indicating which hand would be used to write with, to hold a nail when hammering, to hold scissors when cutting, to hold a dish when wiping it and to hold a tennis racquet when playing tennis. Other less reliable tests for handedness include speed of movement and strength.

Hand dominance statistics from various studies are included in Table II.

It can be noted from the literature that there is an increase in the percentage of the population of left handed individuals due to a

decrease in negative attitudes toward left hand preference.

TABLE II

HANDEDNESS PERCENTAGES BY AUTHOR

AUTHOR	N	RIGHT	LEFT	NEITHER
Belmont & Birch (1967)	148	76%	10%	14%
Way (1958)	410	84%	11.8%	4.2%
Lund (1932)	-	90%	5%	5%

HANDEDNESS AND EYEDNESS

It was suggested by Gould (1908) that dominant handedness originates in dominant eyedness. Lund (1932) concluded:

> "... to the extent that virtually all the right eyed are at the same time right handed, we are justified in believing that the natively left eyed irrespective of their present manual state were all originally left handed."

Lund (1932) theorized that having the dominant eye on the same side of the body as the dominant hand would be advantageous. Since a higher percentage of the population is right handed compared to the percentage of the population that is right eyed, Clark (1952) surmised that a considerable number of right handed people must be left eyed. Crossed laterality, or the condition of the dominant hand and the dominant eye on opposite sides of the body was discussed by Berner and Berner (1953) as a disadvantage in that these individuals show slow development of motor coordination, poor visual imagery, and very poor reading and spelling skills. Way (1958) in her study of 410 college women found crossed laterality in 43% of the sample with the largest group of this percentage (28.4%) preferring the use of the left eye and right hand. Belmont and Birch (1963) determined in their study of 148 children ages 5 to 12, that "in terms of age specificity of eye-hand relations, it may be seen

that there is a general tendency for ipsilateral utilization of hand and eye to increase with age". Flick (1967) found that in children 9-11 years of age, 63.5% showed pure dominance in eye-hand preference while 36.5% showed mixed dominance.

Lund (1932) concluded from a study of 247 subjects that using the dominant eye with the dominant hand in an aiming test was advantageous over using the non-dominant eye with the dominant hand.

Fink (1933) discussed studies regarding the crossed dominant individual in sporting activities. These individuals were reasonably successful when he or she did not strain and used two eye vision, but when the player became anxious when exact sighting was necessary, binocular vision changed to monocular vision and the player had to pick up alignment with the dominant eye along its sight of vision away from the dominant hand. Fink (1933) stated that a certain amount of indecision and awkwardness was apparent because the grouping of the principle motor centres was disarranged.

FOOTEDNESS

The research completed on the subject of the dominant foot is scant. Irwin (1938) performed a study to determine the relationship of dominance to the performance of physical activities. In this study, the subjects were asked to respond to a series of questions regarding which foot was used for particular activities. The subjects' responses were compared to actual results of foot dominance tests. It was found that a wide difference existed between the subjects' statements of footedness and the actual results of the footedness tests. In fact, in the 16-18 age group (N=46), 91% responded that they were

right footed when in fact, after actual testing 33% were right footed. Irwin (1938) summarized that the discrepancy between the two results may be due to the fact that there is less social and environmental pressure in establishing a preferred foot than there is in establishing a preferred hand. In fact, in all of the subjects tested (N=154), 69% were ambidextrous with regard to footedness. Another conclusion reached by Irwin (1938) was that there is "less conscious use of the feet with respect to dominance" and that in many activities it is difficult to determine which foot is actually the dominant foot.

Way (1958) studied footedness preferences among college women and through testing found that in the sample (N=410), 47.3% preferred use of the right foot, 23% preferred use of the left foot with 29.4% indicating no definite preference. It was noted in this study that subjects with foot ambidextarity scored higher in motor ability tests.

In a study of lateral dominance and right-left awareness in children, Belmont and Birch (1963) tested 148 children ranging in age from 5 to 11 years for footedness. Their results indicated clear preferences for foot usage with 85% preferring the right foot, 12% preferring the left foot and 4% showing no preference. This indicated that by the sixth year of life, children have developed definite foot preferences. This conclusion seems to contradict Irwin's (1938) summary stated earlier.

When 293 girls and boys between the ages of 15 to 18 years were asked the question: "What is your main leg?", by Weiser (1965), the responses indicated that 66% of the girls and 62% of the boys preferred their right leg. The largest percentages of right leg response occurred in the higher age groups of 15-18 years of age.

Eyre and Schmeeckle (1933) tested 280 subjects for eye, hand and foot preference. It was found that the correspondence of the same side hand and foot (that is, dominant right hand with dominant right foot), is greater than the correspondence of same side eye and hand or same side eye and foot. In fact, 70.5% of the subjects showed correspondence of right hand and right foot.

As can be seen by the above review of footedness studies, there seems to be some confusion still remaining regarding the phenomenon of the dominant foot. This confusion may be the result of testing procedures utilized to ascertain foot dominance. Some of these tests and the researchers that utilized them are indicated below.

1. Kicking A Ball - Belmont and Birch (1963)

   A ball is placed in front of the subject and the subject is told to kick it; the foot used to kick the ball is indicated as the dominant foot.

2. Soccer Dribble - Irwin (1938)

   A soccer ball was placed on the ground and the subject was asked to dribble the ball a distance of thirty yards; the foot used in dribbling in each trial was recorded as the dominant foot.

3. Hopping On One Foot - Irwin (1938)

   The subject was asked to hop the distance of thirty feet on one foot; the foot used in hopping was recorded as the dominant foot.

4. Standing Start From Behind A Mark - Irwin (1938)

   A line two feet in length was drawn on the gym floor to serve as a starting line. The subject was asked to assume a standing starting position behind the startin line. At a signal from the starter, the subject ran ten yards. The back foot in the starting position was recorded in each trial as the dominant foot.

5. Jumping A Five Foot Gap Between Gym Mats - Irwin (1938)

Two gymnasium mats were arranged to provide a five foot gap between them. The subject was asked to take a short run and jump the gap. The foot leaving the mat last was recorded in each trial as the dominant foot.

It seems apparent that in using the above test it is necessary to allow for more than one trial in order to accommodate the possiblity of ambidexterity. The reliability coefficient for the tests used by Irwin (1938) was .84 $\pm$ .02.

It still may be true however, that it is not always easy to determine the dominant foot in many activities and this uncertainty suggests to the author that much more research is required in this area of study.

CHAPTER III

METHODS AND PROCEDURES

SAMPLE

Data was collected from 64 senior category women fast pitch softball players. The players were from Kitchener, Ontario; Lashburn, Saskatchewan; Saskatoon, Saskatchewan; Calgary, Alberta; and Edmonton, Alberta. Each of these teams competed in the provincial finals for their provinces and two represented their provinces in competition for the national title.

The players ranged in age from 18 to 35 years with a mean age of 22.96 years.

The testing of the sample occurred at a senior category women's fast pitch softball tournament in Sangudo, Alberta on July 5 - 6, 1980 and was continued at a similar tournament in Manville, Alberta on July 12 - 13, 1980.

TESTING SITE

The subjects were tested in open areas between playing fields at the tournament sites. To establish consistency in recording results the measuring apparatus necessary to gather information was kept in one location during the particular tournament.

PRELIMINARIES

Prior to any testing, subjects were asked to respond to questions regarding their name, age, position, the team they played for, years of playing at a junior level, years of playing at a senior level, years with present team and years with any other team (Appendix A).

EYE DOMINANCE MEASURING TECHNIQUE

Eye dominance was ascertained by the "alignment test" used both by Crovitz and Zener (1962) and Adams (1965). Each subject was given a pencil and was asked to align the pencil, with both eyes open, to a black dot, ½" in diameter on a white card held seven feet away. The subject was then asked to close her right eye. With the right eye closed, the subject was asked if the pencil was still aligned with the dot. The same procedure was followed with the left eye closed and the right eye open. If the pencil remained aligned with the dot with the right eye closed, this was classified as a dominant left eye report. If the pencil remained aligned with the left eye closed, this was classified as a dominant left eye report. Adams (1965) validated the above test with a 'hole-in-card' test which gave identical results in his study.

HANDEDNESS TESTING PROCEDURE

For the purposes of this study, the dominant hand was indicated by asking the subject which hand was used for the unilateral tasks of writing and throwing. Both of these activities were included in a fourteen part questionnaire devised by Crovitz and Zener (1962) to determine handedness.

FOOTEDNESS TESTING PROCEDURE

Foot preference was tested by two different procedures. First, a ball was placed in front of the subject and she was directed to kick it to the examiner. The foot chosen to kick with was indicated as the dominant foot. Both Eyre (1933) and Irwin (1938) utilized this test in their studies of dominance.

As well, the subject was asked to hop a distance of ten yards on one foot. The foot used to hop on was indicated as the dominant foot. This test was utilized as well by Irwin (1938).

In all of the above dominance test, three trials were given each subject so as to determine dominance or non-dominance of eye, hand or foot.

COLLECTION OF DATA

The number of times at bat for each subject was obtained from the statistician for each team at the conclusion of the season. The total number of times at bat ranged from a low of 12 times at bat to a high of 213 times at bat.

The number of hits for each player was also recorded. By comparing the number of hits to the number of times at bat, the subject's batting average was computed.

The number of times that each player struck out was also noted. This was compared to the number of times at bat so as to calculate a figure to be known as the subject's strike out percentage.

When all the data was collected for each subject, the following was known: dominant eye, dominant hand, dominant foot, side of plate batting from, batting average and strike out percentage (Appendix B).

STATISTICAL ANALYSIS

Chi square testing was employed to determine the relationship of dominance types to batting performance and also to determine the relationship of side of plate batted from and batting performance.

CHAPTER IV

RESULTS AND DISCUSSION

CHARACTERISTICS OF SUBJECTS

The eye, hand and foot dominance characteristics for the 64 subjects participating in this study are presented in Table III.

TABLE III

DOMINANCE CHARACTERISTICS OF SUBJECTS

	N	RIGHT	LEFT	NEITHER
Eye	64	68.75% (N=44)	31.25% (N=20)	0% (N=0)
Hand	64	82.81% (N=53)	17.19% (N=11)	0% (N=0)
Foot	64	73.44% (N=47)	14.06% (N=9)	12.5% (N=8)

The percentages for eye dominance for the subjects in this study compare rather closely with the percentages found in studies by Miles (1930), Lund (1932), and Way (1958) found in Table I. Also the percentages for hand dominance compare closely to Way's (1958) percentages found in Table II. Since there is very little in the literature with which to compare the foot dominance percentages and of the statistics found, a wide variation exists, it is included as a descriptive statistic only and is not included in the analysis of data.

The laterality groups within the study are detailed in Table IV.

TABLE IV

LATERALITY GROUPS

	Number in Sample	Percentage in Sample
GENERAL		
Unilateral	45	70.31%
Crossed lateral	19	26.69%
SPECIFIC		
Pure dextrals	39	60.94%
Crossed dextrals	14	21.88%
Pure sinistrals	6	9.37%
Crossed sinistrals	5	7.81%

The percentages for unilateral and crossed lateral groups are consistent with Clark's (1957) findings of 70% pure laterals and 30% crossed laterals. Flick (1967) found pure laterals in 63.5% in children 9 - 11 years of age and crossed laterals in 36.5% of the same age group.

BATTING PERFORMANCES OF SUBJECTS

The batting performance results of the general laterality groups are listed in Table V.

TABLE V

PERFORMANCE SCORES OF UNILATERALS AND CROSSED LATERALS

BATTING CATEGORY	SUBJECTS	MEAN FOR UNILATERALS	MEAN FOR CROSSED LATERALS
Batting Average	64	.295	.265
Strike Out Percentage	64	6.20%	8.95%

The table shows that the unilaterals had a higher mean batting average and a lower mean strike out percentage than the crossed laterals. However, the differences were not significant at the .05 level of significance as indicated in Table VI by the chi square values.

TABLE VI

COMPARISON OF BATTING PERFORMANCE TO DOMINANCE TYPE

BATTING CATEGORY	CHI SQUARE VALUE	DF	CRITICAL VALUE
Batting Average	.026	1	3.84
Strike Out Percentage	.027	1	3.84

It can therefore be concluded that there is no relationship between dominance type and batting performance under the conditions of this study. As Adams (1965) indicated in his study, other factors such as batting stance may have some effect on batting performance.

A second comparison was made between batting performances of those subjects who stood on the side of home plate that placed their dominant hand and dominant eye closest to the pitcher and those that did not. This was done in order to discover the basis for McGee's (1975) statement that those individuals who do bat with the dominant body side closest to the pitcher would be more successful than those who did not.

The batting averages and strike out percentages for these two groups of subjects are indicated in Table VII.

TABLE VII

PERFORMANCE SCORES OF BATTERS WITH DOMINANT BODY PARTS CLOSEST TO PITCHER AND THOSE NOT CLOSEST TO PITCHER

BATTING CATEGORY	SUBJECTS	MEAN FOR DOMINANT SIDE	MEAN FOR OTHERS
Batting Average	64	.319	.281
Strike Out Percentage	64	4.82%	7.33%

The higher mean batting average and lower mean strike out percentage for those batters who bat from the side of the plate placing their dominant body parts closer to the pitcher are not significantly different from the mean batting average and mean strike out percentage of the others at the .05 level of significance as shown in Table VIII.

TABLE VIII

COMPARISON OF BATTING PERFORMANCE AND BODY SIDE FACING PITCHER

BATTING CATEGORY	CHI SQUARE VALUE	DF	CRITICAL VALUE
Batting Average	.083	1	3.84
Strike out percentage	.007	1	3.84

Therefore, the advantage that McGee (1975) indicated to be evident for batters batting from this position does not seem to be evident.

CHAPTER V

SUMMARY AND CONCLUSIONS

SUMMARY

The purpose of this study was two-fold; first to determine the relationship of various combinations of eye and hand dominance and the skill of batting in fast pitch softball; and second, to determine specifically if batting from the side of the plate that placed dominant eye and hand closest to the pitcher was advantageous to the player's batting performance.

The sample consisted of 64 senior category women fast pitch softball players from three Canadian provinces.

A total of four tests were given to each subject to determine eye, hand and foot dominance. The subjects' individual batting average and strike out percentage were obtained for the 1980 season.

The data was submitted to a chi square 2 x 2 table statistical analysis.

The study concluded that there are no significant differences in batting performances in categories of batting averages and strike out percentages between general laterality groups. The study also concluded that there were no significant differences in batting performances of those subjects who bat from the side of the plate that places the dominant eye and hand closest to the pitcher and those who do not.

CONCLUSIONS

Within the limitations of the study, the following conclusions appear to be justified:

1. No eye-hand dominance combination is predictive of women's fast pitch softball batting performance.
2. Batting in such a way as to place dominant body parts closer

to the pitcher does not improve batting performance.

RECOMMENDATIONS

1. Further studies be done on a larger sample.
2. More tests for eye dominance, hand dominance and foot dominance be utilized.
3. Further research be done on the role of foot dominance in motor skills.

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APPENDIX A

QUESTIONNAIRE

NAME _____

TEAM _____

AGE _____

POSITION/S _____

YEARS PLAYING JR. _____

SR. _____

YEARS WITH PRESENT TEAM _____

YEARS WITH ANOTHER TEAM _____

DOMINANT HAND		BATTING		DOMINANT FOOT		DOMINANT EYE	
RT	LEFT	RT	LEFT	RT	LEFT	RT	LEFT

APPENDIX B

DATA

DATA

Subject	Eye	Hand	Foot	Bats From	Batting Average	Strike Out Percentage
1	R	R	R	R	.409	0%
2	R	R	R	L	.270	2.70%
3	L	L	L	L	.200	4.0%
4	R	R	A	R	.167	5.56%
5	R	R	A	R	.429	10.71%
6	R	R	R	R	.250	0%
7	L	L	L	L	.400	0%
8	R	R	R	R	.316	0%
9	R	R	R	R	.317	9.76%
10	R	R	R	R	.357	10.71%
11	R	R	R	R	.414	6.89%
12	R	R	R	L	.500	5.0%
13	R	R	R	R	.462	3.85%
14	R	R	R	R	.256	5.13%
15	L	R	R	R	.247	2.69%
16	R	R	R	R	.194	10.0%
17	R	R	R	R	.274	9.59%
18	R	L	R	L	.191	22.62%
19	R	R	R	R	.196	9.46%
20	R	L	L	R	.133	17.5%
21	R	R	A	R	.195	4.14%
22	L	R	R	R	.267	10.0%
23	L	R	A	R	.259	12.64%
24	L	R	R	L	.160	5.40%

Subject	Eye	Hand	Foot	Bats From	Batting Average	Strike Out Percentage
25	L	L	L	R	.209	9.20%
26	R	R	R	R	.306	0%
27	L	L	L	L	.474	1.75%
28	R	L	R	L	.302	1.59%
29	R	R	R	R	.275	2.5%
30	R	R	A	R	.360	4.0%
31	R	R	R	R	.358	1.49%
32	L	R	A	R	.452	1.37%
33	L	R	R	R	.288	6.78%
34	L	R	A	R	.278	25.0%
35	L	R	R	R	.294	7.84%
36	R	R	R	R	.313	2.99%
37	R	R	R	R	.261	8.69%
38	R	R	A	R	.293	6.37%
39	L	R	R	R	.219	2.08%
40	R	R	R	R	.409	2.27%
41	R	R	R	R	.292	9.72%
42	L	R	R	L	.235	7.84%
43	R	R	R	L	.233	5.26%
44	L	R	R	R	.159	25.0%
45	R	L	R	R	.333	3.0%
46	R	R	R	R	.278	6.94%
47	R	R	L	R	.304	4.35%
48	R	R	R	R	.226	8.33%
49	R	R	R	R	.455	13.64%

Subject	Eye	Hand	Foot	Bats From	Batting Average	Stike Out Percentage
50	R	R	R	R	.260	10.39%
51	L	R	R	R	.307	3.92%
52	R	R	R	R	.156	7.34%
53	R	R	R	L	.376	2.38%
54	R	R	R	R	.212	18.18%
55	R	R	R	R	.219	9.49%
5[illegible]	L	L	R	R	.250	10.94%
57	L	R	L	L	.290	4.30%
58	R	L	L	L	.315	4.57%
59	R	R	R	R	.120	20.0%
60	R	R	R	L	.324	2.07%
61	L	R	R	L	.301	5.83%
62	L	L	L	R	.395	0.98%
63	R	R	R	R	.224	5.13%
64	R	R	R	R	.072	7.14%